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September 29, 2022

VIA E-MAIL and U.S. MAIL

Paul Ruesch
On-Scene Coordinator
United States Environmental Protection Agency Region 5
77 West Jackson Boulevard (SE-5J)
Chicago, Illinois 60604-3590

Dear Paul Ruesch:

SUBJECT: Michigan Department of Environment, Great Lakes, and Energy (EGLE) and Michigan Department of Natural Resources (MDNR) comments on the Area 4 Time Critical Removal Action (TCRA) Removal Work Plan (RWP) Draft, Revision 1, and associated Appendices, dated August 2022, Operable Unit 5 (OU5) Allied Paper Inc./Portage Creek/Kalamazoo River Superfund Site (Site).

By way of this correspondence, EGLE formally submits this cover letter and detailed comments (attached) on the subject documents for inclusion in the Administrative Record for the Site.

EGLE and MDNR staff (collectively, the State of Michigan [SOM]) have reviewed the subject removal work plan (RWP) and the associated Appendices and supplemental information that form the basis for what is referred to in this letter and attached comments as the Revised Design Package. The RWP and appendices were submitted on August 15, 2022; the Supplemental Submittal Package that included five standalone documents- a Submission Memo, the Tributary and Riffle Grading Plans and Details, the WCS and Trowbridge Dam Removal design sheets, and additional information requested by the SOM review team - was provided on September 1, 2022, and a subset of results from the Phase 3 Pre-Design Investigation (PDI) that were provided on September 26, 2022.

The SOM Review Team also incorporated comments on the Area 4 TCRA PDI Summary Report that was submitted in July 2022 and the Turbidity Monitoring Plan (TMP) and Field Monitoring Plan (FMP) which were submitted in July 2021 and May 2022, respectively.

The SOM review team and our contractors have performed a rigorous technical review of the Revised Design Package and other documents mentioned above, and developed detailed, technical comments related to very specific and very technical aspects of the design as we have done in the past. However, consistent with the approach requested by the United States Environmental Protection Agency (US EPA) for this review, the comments provided in our comment set (attached) are only a high-level summary of our technical comment set, and our intent is to provide the detailed comments to the technical work group in the very near future.

The SOM review has identified systemic issues in the Revised Design Package related to short- and long-term channel stability, and we have concerns about the short- and long-term impacts to natural resources that would result if the design were implemented. Ultimately, a collaborative review process provides the best hope for the group to reach a consensus on how to address key, lingering technical issues, understand the range of outcomes that are possible based on uncertainties in the proposed design, and evaluate ways to maximize outcomes and minimize resource impacts. The SOM review team is willing and committed to working collaboratively with the technical work group to resolve key, technical issues.

The SOM review team appreciates the opportunity to review and comment on the OU5 Area 4 TCRA Revised Design Package, and we look forward to sharing more technical detailed comments in the very near future. If you have any questions, please contact Daniel Peabody, Environmental Quality Analyst, Remediation and Redevelopment Division at 517-285-3924; PeabodyD@Michigan.gov; or EGLE, P.O, Box 30426, Lansing, Michigan 48909-7926

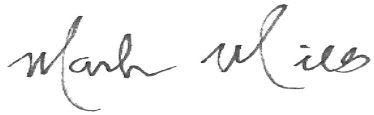
Sincerely,

A handwritten signature in black ink that reads "Daniel Peabody".

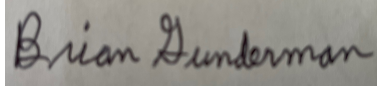
Daniel Peabody
Environmental Quality Analyst
Remediation and Redevelopment Division
EGLE

A handwritten signature in blue ink that reads "Luke A. Trumble".

Luke Trumble
Dam Safety Unit Supervisor
Water Resources Division
EGLE



Mark Mills
Southwest Region Manager
Wildlife Division
MDNR



Brian Gunderman
Southwest Lake Michigan Unit Manager
Fisheries Division
MDNR

cc/att:

Sarah Rolfes, US EPA
Jim Saric, US EPA
Megen Miller, Michigan Department of Attorney General
Keegan Roberts, CDM Smith
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Matt Diana, MDNR
Michael Alexander, EGLE
David Kline, EGLE
John Riley, EGLE
Lee Schoen, EGLE
Joseph Walczak, EGLE

ITEM NO.	REVIEWER	REFERENCE TO GEI SUBMITTAL (i.e., Section X.X, Page XX)	COMMENT (+ reference(s) to support)	SUGGESTION / RECOMMENDATION
General Design/Stability Concerns				
1	State of Michigan	General	Hard armoring of bed and banks during previous dam removal projects in Michigan have not typically been permitted due to impairments to ecological and stream function and extensive maintenance requirements, which result in additional environmental impacts.	Consider implementing dam removal and channel construction methods that rely less heavily on hard armoring and provide improved ecological and stream function in order to better align with typical state permitting requirements.
2	State of Michigan	DRRS Report	Though coarsening of riffles can be a method to locally stabilize the streambed, the arrangement of these 12 riffles does not take into account their influence and dependence on one another. There are examples of riffles within these 12 that could be undermined through downstream scour and piping below riffle materials (when constructed on deposited sand). When one riffle fails, it compounds the forces on the next upstream riffle, leading to the potential for a "domino effect" of riffle bed failure and systemwide instability. Further to this, when reviewing floodplain undulations associated with low bank height, it seems contraction and expansion scour could add a third dimension/concentration point to localized scour adding risk to riffle stability.	Any riffle design needs to incorporate hydraulic influence from other channel features including adjacent riffles and floodplain undulation/expansion and contraction.
3	State of Michigan	General	Treatment of bank failures through additional installation of rock will create channel dimensions that deviate from the original design and modeled conditions, likely further narrowing the channel, leading to increasing velocities and shear stresses that will exacerbate instability.	Design to dissipate energy, rather than outcompeting energy, therefore decreasing reliance on long-term maintenance of structures that will lead to deviations from modeled channel dimensions, risking further instability.
4	State of Michigan	220901_GEI_A4_TCRA_S uppl Revised Design Submission Memo.pdf, Page 1 re design lifespan	The memo indicates that riffle and bank toe stone were sized to withstand a 100-year flood event or greater, citing stable particle design using the NRCS National Engineering Handbook, USGS, and USBR design criteria. However, in order for hardened banks and streambeds to provide stability, long-term maintenance is required. Analysis of design life must incorporate long-term maintenance requirements and not solely focus on particle mobility during a single flood event. Language related to maintenance is generally included in the cited design criteria documents.	Consider long-term maintenance requirements of bank and bed hardening and include this in cost/risk analysis for design of stable channel and banks. Consider approaches that require less long-term maintenance or develop adequate plans and commit to performing long-term maintenance to ensure stability as required.
5	State of Michigan	General	A monitoring and maintenance plan was not provided as part of this deliverable package. The State recognizes the importance of this plan in evaluating the proposed design as the State has considerable concerns regarding stability of the channel, safety of the conditions created, functionality of the restored system, and ability to restore native vegetation. Without this plan, the State is unable to holistically review the proposed design.	Develop the M&M plan IN CONJUNCTION with the design as it is finalized. Components of the design should include, but are not limited to: 1) develop as-builts of the completed work, 2) quantitatively evaluate the as-built design with a model calibrated by current, on-site measurements of water surface elevations and velocities that shows the as-built performance (velocities, shear stresses, WSE's for various flows up to 200 year events, etc.) vs. the modeled performance of the design, 3) Monitoring protocol, 4) monitoring frequency, 5) bank pins to measure erosion in areas of greatest concern, etc..
6	State of Michigan	General	Undulations of floodplains can cause contraction and expansion scour as various flood discharges are able to access, or are prevented from accessing, floodplains. This scour can destabilize both bank and bed treatments on a local scale. However, these treatments all act in concert. So, instability in a localized reach, that was expected to provide stability to other treatments, can lead to systemic instability.	Design to dissipate energy through excavation of flood surfaces that parallel water surfaces for a given discharge rather than creating undulations of flood surfaces. Multi stage channels accomplish this concept well.
7	State of Michigan	Full Design Plans	To date, state agencies have not been provided a full set of design plans. These plans have been requested and the request was acknowledged during previous meetings with EPA and the design team. Full plans are necessary to understand all design components and complete a thorough review.	Provide a full set of design plans for state agency review.
8	State of Michigan	Removal Work Plan Draft, Revision 1 Section 6.2, page 23 and 24	Section 6.2 states that the riffle grade-control structure and the dam corridor banks will be constructed at least partially with rubblized dam foundation material. Concrete material from the dam foundation may be used to fill scour holes if clean, free of contamination, and has no protruding rebar. All reused concrete should be capped in natural material and cannot be placed within 1 foot of stable finish grade.	Revise Section 6.2 to state that the dam foundation material will only be used as described in this comment.

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9	State of Michigan	General	Hydraulic conditions of the as-built project in Area 3, such as bank height ratios and/or entrenchment ratios, are more favorable for channel stability than much of the reach proposed in Area 4. However, numerous locations in Area 3 have already required, or are in need of, maintenance activities to rebuild/protect the designed structure. Those bank treatments of stone toe and toe wood are already succumbing to stream forces, in the 4 years since construction. The hydraulics proposed in significant portions of Area 4 are more aggressive than the as-built condition in Area 3.	Consider lessons learned from Areas 2 and 3 when considering bank stabilization methods in Area 4 and avoid reliance on methods that require long-term maintenance to provide stability.
10	State of Michigan	General	Designs include extensive armoring of banks due to high water velocity and shear stress. Sentiment has been expressed that the Kalamazoo River is heavily armored throughout the lower river (Morrow Dam to Lake Michigan) and impacts exist throughout the system and as a result the design can does not need to incorporate more natural features. The prevalence of hard armoring was evaluated throughout the Kalamazoo River from Morrow Dam to Kalamazoo Lake (excluding Lake Allegan). Natural shorelines made up 92.3% of the riverbanks over this stretch. Sites where Superfund projects were 51.6% armored with rock and only 48.4% natural, much of which is toe wood structures in area 3. The remaining stretches of the river comprise of 95% natural shorelines. The two riffles located in area 3 (former dam riffle and constriction riffle) are by far the most aggressive riffles in the lower Kalamazoo River. These riffles as built are also more aggressive than modeled in the proposed design for area 3.	Artificial design constraints based on existing infrastructure should not be utilized. Allowing for armoring and riffles because of perceived impacts in other locations in the watershed is not only inappropriate, but not supported by the empirical evidence. The lower 23 miles of the Kalamazoo River is a designated Natura River (Part 305 of P.A. 451 of 1994) and the section in the City of Kalamazoo is protected by a Natural Features Ordinance that ensure future protection on the river. Outside of the project areas, the river is wild and has very little development on the banks. A large portion of the river flows through the Allegan State Game Area and will not be subject to future development. Designing to match the worse features on the river ignores the and damages future conservation and recreation.
Sediment Related Concerns				
11	State of Michigan	General	In order to allow for any dredging, mobilization, or disposal (either onsite or off) of impounded sediments, adequate characterization and management plans need to be provided to the state for review and approval. These documents need to be reviewed and approved by Water Resources Division, Remediation and Redevelopment Division, and Materials Management Division of EGLE. Though some of this data has been provided to EGLE in PDI Phase III, some data is still outstanding, more data an analysis may be required if exceedances of applicable criteria occur, and a sediment management plan that considers all relevant data has not yet been provided.	Provide to EGLE for review and approval all relevant sediment data as it becomes available and develop a comprehensive sediment management plan based on the results of this data collection.
12	State of Michigan	General	The State does not support on-site disposal of dredged sediment based on currently available data (not all data is yet available). Additionally, the State believes that the location proposed for disposal will remain wetland post-dam-removal and should not be considered for disposal.	Consider alternative disposal approaches. State will re-evaluate this stance when all data is available.
13	State of Michigan	Removal Work Plan Draft, Revision 1	Sediment volume proposed to be mobilized, even if chemically inert, would result in significant physical impacts to downstream communities.	Reduce volume of mobilized material that will impact downstream ecological communities and receptors.
14	State of Michigan	Removal Work Plan Draft, Revision 1 / PDI-III_T113111A_Sediment_Results_v20220926 All	Existing draft analytical data from PDI III suggest that the sediment contains contaminants that exceed ecological screening levels, based on this information, sediment would not be allowed to mobilize under State criteria. Additional data is pending from PDI III (PCBs), and PDI IV. State will re-evaluate this stance when all data is available.	Conduct bioassay to determine biological availability of contaminants. Provide excel format analytical results from PDI III, and PDI IV, to facilitate comparisons with appropriate criteria.
15	State of Michigan	Removal Work Plan Draft, Revision 1	Regarding dredge prisms/dredge management units, it's not clear how many samples were used to derive prisms, how many dredge prisms are being proposed, and how confirmation sampling will take place.	Please supply a map showing dredging prisms, PDI samples used to develop cutlines within those prisms, and provide explanation on how many confirmation samples will be used post-dredge to evaluate progress towards RAL/CUGs. Will the dredge prisms be used as units for confirmation sampling? Please provide confirmation sampling SOP for review prior to finalization and implementation. A residuals management plan should be developed to determine necessary actions if RAL/CUGs are not reached after initial dredge. How are pilot channel materials going to be handled, if the PDI III and IV results demonstrate presence of contaminated material? Other analytes, outside of PCBs (please see WRD-048) should be analyzed for during confirmation sampling.
16	State of Michigan	PDI-III_T113111A_Sediment_Results_v20220926 All	Several analytical results appear to be non-detect, with detection limits in exceedance of relevant standards and/or screening values.	Please provide a contingency plan for instances where final analytical results are non-detect, and detection limits that are above relevant standards and/or screening values.

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17	State of Michigan	Removal Work Plan Draft, Revision 1	Scope of work states sediment dredging will be limited to subarea E, with limited portions in subarea G. Figure F proposes sediment dredging in area F.	Is the project proposing to remove contaminated sediment above CUG/RALs from subarea F? Please update text, or map.
18	State of Michigan	RWP, Appendix A, 2.1, Page 4	The State does not support disposal or placement of dredged or excavated material in Subarea F. It is MDNR's belief that, following dam removal, this area will remain wetland. Therefore, filling of that area would constitute filling of a wetland. Removal of the dam will result in some loss of wetland area so those areas that may remain wetland post-removal should be protected to allow for the wetland impacts to be minimized. This comment is independent of the chemical analyses of the proposed fill material.	Look for other disposal routes for dredged materials not required to go to landfill due to PCB contamination. The State will consider other on-site options pending the proposed sampling to characterize sediments.
19	State of Michigan	General	The State does not support "beneficial reuse" of material based solely on said material testing below action levels for PCBs.	Follow State criteria for evaluating reusability or placement of materials.
20	State of Michigan	Removal Work Plan Draft, Revision 1 Section 5.4.1, Page 17	Sediments in the side channel area of Subarea F are shown to target 11mg/kg in the cross sections in appendix C. EGLE strongly disagrees with this approach as this area is an active portion of the river and not a floodplain during sediment removal. Additionally this design is planning to remove lower level surface concentrations and replace them with higher concentrations above the sediment FRG.	Target 1 mg/kg for removal in Subarea F
21	State of Michigan	Removal Work Plan Draft, Revision 1 Section 5.4.1, Page 17 and Figure 6	This section states that approximately 150,000 cubic yards of material from the pilot channel will be deposited in Subarea F. These sediments may have concentrations up to 11 mg/kg, which are five to ten times higher than existing surface concentrations (most are around 1 or 2 mg/kg as shown on cross sections in appendix c), and therefore may result in a significantly worse conditions than exist currently.	Sediment from the pilot channel should be sampled and if placed in Subarea F, should be placed in areas where existing conditions match the material being filled. If that is not possible the pilot channel material should be disposed of. It is irresponsible to take an area with no exceedances over 1 mg/kg and transform that area into an 11 mg/kg contaminated region.
22	State of Michigan	General	Does the volume of material being projected to erode include mobilization of materials above RM47.25 but within the current influence of the Trowbridge dam impoundment? A total estimate of 330,000yd3 is given for the TCRA, but the documents identify the intent to reuse and dispose of a significant quantity of material on-site during the TCRA. Does the 330,000yd3 only include material going to the landfill or does it also include material proposed for re-use/disposal on-site? If so, what is the total volume being hauled for off-site disposal and what are the total volumes proposed for reuse? EGLE has not seen figures showing where "clean" materials proposed for re-use would originate from or a formal plan detailing what steps would be taken to try and separate "clean" from "dirty" material based on the PCB remediation cuts that are included in the figure set.	Clarify volumetric estimates. Identify sources of material proposed for reuse.
23	State of Michigan	PDI Phase 3 Data	As mentioned in EGLE's previous comment letter, the Phase 3 PDI data should be compared to the US EPA Region 5 Ecological Screening Levels and it would not be appropriate to simply screen results against EGLE's Part 201 nonresidential criteria. And, what is described is consistent with the approach already taken at the Site at OU7 - Plainwell Mill (OU7 SRI Report, Appendix J, https://semspub.epa.gov/work/05/911856.pdf)	Revise tables and insert appropriate screening levels into analytical summary table.
Hydrologic/Hydraulic Concerns				
24	State of Michigan	General	Several concerns exist with the 1D sediment transport model and 2D hydraulic model and how results from those models have been incorporated into channel design for stability and mobilization of impounded sediments. Inconsistencies or errors in the models could result in need for design revisions.	Rectify issues with the 1D and 2D models as further described in comments 25-29 below. Once corrected, consider design revisions as appropriate.

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25	State of Michigan	General	Bankfull flows, which are very important in the hydraulic model and design, are estimated by GEI to be at least 25%-35% higher than bankfull flows estimated by AECOM in 2017 2900 cfs @ Trowbridge from 2017, 2695 cfs @ Allegan City 2022, GEI is 3630 cfs bankfull in design report. This suggests the bankfull discharge may be overestimated resulting in bank-height ratios, channel incision, and some other measures, likely higher (therefore, less acceptable to the State) than those represented in the design report and may result in instability of the proposed design.	Provide justification for using bankfull discharges that differ that much from those we know to be diligently prepared.
26	State of Michigan	General	Previous estimates of bankfull discharge at Trowbridge Dam have been significantly lower than what GEI has used in their design. Differences are on the order of 1000cfs (25-33%). Overestimating bankfull discharge would result in overestimating of bankfull depth and skew of several of the metrics used to perform geomorphic assessment of channel stability.	Continue to work with AECOM, USGS, and others to developed a better understanding of bankfull discharges along the Kalamazoo River. Adjust design flows and overall design as appropriate once bankfull discharged is confirmed/revise.
27	State of Michigan	1D/2D Model Comparison	No comparison of the 1D HEC-RAS model used for sediment transport to the 2D HEC-RAS model used for other purposes has been provide to state agencies. Though differences resulting from computational methods utilized by the models are expected, the models should show a certain level of agreement when comparing water surface profiles, velocities, etc..	Provide a comparison of the two models and rectify/explain any differences observed.
28	State of Michigan	2D Model Review	There are appear to be several instances where the bathymetric surface does not tie into the topographic surface appropriately. These apparent issues result in what resemble levees or berms alongside the channel in several locations and would be expected to skew model results if not representative of real features.	Review the bathymetric/data and rectify any areas where levees/berms are depicted in the model but do not exist in the field.
29	State of Michigan	Removal Work Plan Draft, Revision 1 Appendix A, H&H Modeling	GEI HEC-RAS 1D and 2D models. Suggestion for improved model performance, modeling team communication, and/or project clarity.	Ensure proper contraction/expansion coefficients are applied at WCS, and the dam structures. Typical values of contraction/expansion are 0.3 and 0.5, respectively for contraction and expansion. The dam and WCS have contraction and expansion as well vertically.
Public Safety/Use Concerns				
30	State of Michigan	General	The current design raises several concerns with related to public safety and recreational use of the river post implementation of the TCRA as currently designed, potentially increasing risk and liability of the project team. In addition to stability and other requirements of the TCRA Action Memo, public safety and recreational use need to be highly prioritized design considerations.	Consider design revisions that would provide equal or greater public safety and recreational use as other unimpacted reaches of the Kalamazoo River.
31	State of Michigan	220831_GEI_A4 TCRA_Kalamazoo River Water Velocity Profiles & Figure 26a. Area 4 Plan View of Water Depth for Average Daily Flow in Modeled Alignment & Area 4 TCRA Hydrology, Hydraulics and Sediment Transport Model Technical Memorandum Figure 11	The proposed design poses a considerable safety hazard for recreational users. Proposed riffles exceed slopes and velocities that are observed naturally in the Kalamazoo River or that existed in the pre-dam channel in Area 4. Isolated impacted reaches of the river (e.g., the constructed riffle and unnatural constriction in Area 3) should not be considered as representative of the Kalamazoo River as much of the river is suitable for wading and navigation. Risks to wading anglers or (more likely) capsized paddlers were evaluated using the criteria proposed by Shand et al (2011) for adults. Using the velocity profiles from 220831_GEI_A4 TCRA Water Velocity Profiles and water depths inferred from Figure 26a, approximately 2/3 of the points across all transects have depth*velocity values indicative of significant or extreme risk. When these same risk assessments were run using average bankfull water velocities and average bankfull depths calculated from Table 11, 53 transects scored as extreme risk and the remaining 9 scored as significant risk. Danger to recreational users would be further exacerbated by the presence of the large rocks in the constructed riffles. Citation: Shand, T. D., G. P. Smith, R. J. Cox, and M. Blacka. 2011. Development of appropriate criteria for the safety and stability of persons and vehicles in floods. Proceedings of the 34th International Association for Hydro-Environment Engineering and Research Conference, June 26-July 1, 2011, Brisbane, Australia.	Riffle designs should be modified to accommodate fish passage, navigation and public safety. The ARAR target of 3 fps should be the goal for average cross section velocity during bankful flow, but many other techniques can be employed if these velocities can be demonstrated to be difficult to achieve. If fish passage ARARs are not achievable in all riffles, the design team needs to document why ARARs are not being met to determine if appropriate measures were taken to meet SOM developed design criteria. High velocities in the riffles add to the instability of the design. Applying design changes to individual riffles must take into account stability across the project. Design changes that accommodate stability will also likely lead to reductions in velocity and riffles that are safer to navigate. We recommend reducing velocities to achieve greater stability through a variety of techniques outlined in the SOM comments. Once riffle designs are agreed upon, ideally velocities would be reduced and riffles would not require extensive armoring to attempt to produce stability. This would reduce the risk to public safety and potentially allow for navigation through the site under safe flows.
Biological/Ecological Concerns				
32	State of Michigan	General	The state has several remaining concerns related to impacts to wildlife and degradation of habitat conditions resulting from the proposed design.	Consider and implement activities to protect and enhance ecological conditions as described in comments 33-35.

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33	State of Michigan	Removal Work Plan Draft, Revision 1, Section 7.5.1 and Revised Design Supplemental Submittals Memo 9/1/22, p. 2	MDNR's comments on the Mussel Work Plan and 60% design regarding mussel relocation have not been addressed. While some mussel surveys and relocations have been completed within Area 4, these surveys were conducted before design revisions and did not include the full extent of the disturbed stream reaches. Increasing sediment and turbidity due to anthropogenic activities have been linked to declining mussel populations throughout North America (for examples and reviews see Box and Mossa 1999; Goldsmith et al. 2020; Landis et al. 2013 and 2015; Henley et al. 2000; Osterling et al. 2010). Individual mussels experience both chronic and acute stress when exposed to high sediment loads in water and increased sedimentation or burying. We agree that mussel communities do persist in turbid water of the US, but there are significant differences in communities, species present, and morphological adaptations that allow these populations to persist. The Michigan Mussel Protocol specifically outlines the need to conduct mussel relocations in areas of direct impacts and buffers around these areas if any dredging, mussel bed erosion, mussel bed burying, or impact due to construction activities is expected.	Downstream of the existing dam, mussels should be relocated from areas that will be directly impacted by installation of the turbidity curtains as well as areas that will be indirectly impacted by sediment accumulation upstream of the curtains. The dredging footprint in Subareas C and D also has been expanded due to the addition of a pilot channel. Mussels should be moved out of the proposed pilot channel before dredging and out of the area where sediment mobilization is expected. Mussel relocation efforts should follow the Michigan Freshwater Mussel Survey Protocols and Relocation Procedures for Rivers and Streams - version 3. The effort should be conducted between June 1 and October 15.
34	State of Michigan	Area 4 TCRA Hydrology, Hydraulics and Sediment Transport Model Technical Memorandum Figure 23 and 220831_GEI_A4 TCRA_Kalamazoo River Velocity Profiles.pdf	The proposed design would not facilitate upstream movement of native fish species. To allow upstream passage of all fish species and life stages, average velocities across a transect should be below 3.0 ft/s for flows up to and including the bankfull discharge. According to Figure 23, average daily modeled future average velocity exceeds 3.0 ft/s at twelve locations. At bankfull discharge, the modeled future average velocity exceeds 3.0 ft/s throughout most of the Area 4 TCRA reach, including everything upstream of RM 47.18. These velocities exceed what naturally occurs in the Kalamazoo River. The rock sizes proposed to ensure the riffle substrate is stable are much larger than pebble size found in naturally existing riffles in the Kalamazoo River or substrate found onsite.	Riffle designs should be modified to accommodate fish passage, navigation and public safety. The ARAR target of 3 fps should be the goal for average cross section velocity during bankfull flow, but many other techniques can be employed if these velocities can be demonstrated to be difficult to achieve. If fish passage ARARs are not achievable in all riffles, the design team needs to document why ARARs are not being met to determine if appropriate measures were taken to meet SOM developed design criteria. High velocities in the riffles add to the instability of the design. Applying design changes to individual riffles must take into account stability across the project. Design changes that accommodate stability will also likely lead to reductions in velocity and riffles that are safer to navigate. We recommend reducing velocities to achieve greater stability through a variety of techniques outlined in the SOM comments. Once riffle designs are agreed upon, ideally velocities would be reduced and riffles would not require extensive armoring to attempt to produce stability. This design would better accommodate fish passage. In riffles where fish passage may still be impaired, several alternative techniques can be employed to facilitate passage of specific species (e.g. modifying riffle cross section shape to include benching, arched rock rapids, etc..)
35	State of Michigan	General	The State will withhold comments on restoration, revegetation with native species, and other similar matters at this time and will engage to assist with developing approaches nearer the end of the design process.	EPA, NCR, and GEI should engage with the State to discuss these topics and garner comments following eventual consensus on the design.
Compliance with ARARs/State Law Concerns				
36	State of Michigan	General	The proposed design does not meet multiple State ARARs. No alternatives analysis or sensitivity studies were provided. Without information on the design constraints, considered alternatives, and associated tradeoffs, it is impossible to determine if the proposed design complies with ARARs to the maximum extent practicable.	For each ARAR that is not met, please provide a written description of the alternatives considered, tradeoffs (e.g., ecological, geomorphological, stability, and financial) associated with each alternative, and associated design constraints.
37	State of Michigan	RWP	Tables 2,3,4 include a long list of applicable or relevant and appropriate requirements (ARARs), and text in Section 7.7 mentions that Tables 2,3,4 show ARARs taken from EGLE's May 2020 submission. EGLE appreciates the identification of state applicable or relevant and appropriate requirements (ARARs) in the Removal Work Plan Draft, Revision 1.	As demonstrated by the other comments on the Work Plan, EGLE and DNR do not believe, however, that all state ARARs are being met. Additionally, more information is needed regarding implementation of the Work Plan to determine compliance with state ARARs.